भारतीय मानक
Indian Standard

IS 14387 : 2021

वाल्ट्स — वायु संवातक — विशिष्टि

(दूसरा पुनरीक्षण)

Vaults — Air Ventilators — Specification

(Second Revision)

ICS 13.310

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Security Equipments Sectional Committee, MED 24

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Security Equipment Sectional Committee had been approved by the Mechanical Engineering Divisional Council.

This standard was first published in 1996 and while revising this standard in 2005, the ventilators are classified into four classes in place of earlier three classes.

In this standard the following major changes have been made:

a) Scope is widened for choice of raw materials;
b) Restrictions on hardware materials have been removed;
c) Provisions have been made in the painting requirement to accommodate current industry practices; and
d) For burglar resistance test, the opening has been reduced from 900 cm^2 to 620 cm^2 which is similar to opening for vault (strong room) door.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

The construction of air ventilators for the strong rooms and vaults, which are primarily meant to provide ventilation facility inside a vault (strong room), shall be such as will prevent direct access to the inside of vaults from outside and vice versa. This indirect access is meant to ensure preventing the spread of fire from outside of vaults to inside and thereby to prevent damage to the contents of vaults due to fire.

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

VAULTS — AIR VENTILATORS — SPECIFICATION

(Second Revision)

1 SCOPE

This standard lays down the requirements regarding materials, sizes and details of construction of air ventilators (which are used for ventilating vaults) so as to ensure that security is not adversely affected.

2 REFERENCES

The standards listed in Annex A contain provisions, which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 CLASSES AND DIMENSIONS

3.1 The air ventilators shall be of 4 classes. The recommended use of different classes is given in Table 1.

3.2 Dimensions of the air ventilators for vaults shall be as specified in Table 1 read with Fig. 1.

4 MATERIALS

Materials specified in Table 2 are for general guidance only. The critical quality parameters of the material used for components shall be declared by manufacturer at the time of type approval and records of details of material shall be maintained for conformity during routine production.

5 DESIGNATION

An air ventilator shall be designated by class and number of this Indian Standard.

Example:

An air ventilator of Class A with exhaust fan shall be designated as:

Air ventilator Class A — IS 14387 with exhaust fan.

6 CONSTRUCTION

6.1 For Class B Ventilators

The outer slab shall be of combination of mild steel plates interlaced with oxyacetylene torch resisting material over the exposed surface.

6.2 For Class A, AA and AAA Ventilators

6.2.1 The outer and inner slab shall consist of outer and inner mild steel plates, minimum 5 mm thick, interlaced with a torch and drill resisting (TDR) slab of thickness as specified in Table 1. The construction shall be such that TDR slab is adequately anchored to the inner steel plate to resist an attack that enables removal of the TDR slab itself.

Fig. 1

Table 1 General Requirements of Air Ventilators and their Components

(*Clauses* 3.1, 3.2, 6.2.1, 6.2.4 and *Fig.* 1)

Sl No.	**Description**	**Class**			
		B	**A**	**AA**	**AAA**
(1)	(2)	(3)	(4)	(5)	(6)
i)	Recommended vault (Strong room) class	B	A	AA	AAA
ii)	Dimension H, mm, *Min*	410			
iii)	Dimension W, mm, *Min*	410			
iv)	Dimension D, mm, *Min*	300		450	600
v)	Dimension h, mm	300 ± 25			
vi)	Dimension w, mm	300 ± 25			
vii)	Thickness of outer slab, mm *Min*	22	40	50	60
viii)	Thickness of oxyacetelene torch resisting material in outer slab, mm, *Min*	5	30	40	50
ix)	Thickness of inner slab/plate, mm, Minimum (nominal)	10	40	50	60
x)	Thickness of torch and drill resisting (TDR)* in inner slab, mm, *Min*	–	30	40	50
xi)	Thickness of vestibule frame, mm, *Min* (nominal)	5			
xii)	Thickness of fire insulating material, mm, *Min*	5			
xiii)	Burglary resistance, minutes, *Min*	20	45	90	120

* Torch and drill resisting material capable of resisting a combined/simultaneous attack of oxy acetylene torch and impact tool.

Table 2 Materials for Air Ventilators

(*Clause* 4)

Sl No.	Part	Material
i)	Outer and inner plates and other mild steel components	Any grade of steel having minimum tensile strength of 270 MPa [*see* IS 513 (Part 1), IS 513 (Part 2), IS 1079, IS 2062, IS 5986]
ii)	Oxyacetylene blow-pipe resisting material	Copper conforming to 1S 191 or aluminium conforming to IS 736 or IS 737 or any other material which can resist the attack

NOTE — The manufacturer is free to use any one or more of the applicable input raw materials.

6.2.2 The outer slab shall be adequately welded to vestibule of 5 mm thickness. The inner slab/plate shall be adequately screwed to the vestibule frame.

6.2.3 The vestibule frame shall be of tubular type to suit the wall thickness and to be welded to outer slab. Provision shall be made at inner side for firmly screwing the inner slab/plate.

6.2.4 Alternatively vestibule frame shall be manufactured with two tubular frames sliding one into the other to suit wall thickness as specified in Table 1.

6.2.5 Outer frame shall be firmly welded to the outer slab. Inner frame shall be screwed/welded to the inner slab/plate.

6.3 Outer and inner slab/plate of the ventilator shall be perforated with holes not less than 19 mm diameter and not more than 40 mm diameter for easy flow of air. The total ventilating area in a typical ventilator-unit shall be between 170 and 230 cm^2.

6.3.1 The ventilating holes shall be covered by means of stainless steel wire mesh or copper wire mesh from inside.

6.4 Minimum two baffle plates with minimum 50 mm overlap lined with minimum 5 mm thick fire insulating material, shall be fitted from inside to obstruct direct passage of flame in case of fire.

6.5 Provision shall be made for fixing the inner plate, from inside the vault (strong room). Further the inner slab/plate shall also be fixed to the wall with minimum 4 anchor bolts.

6.6 Air ventilators shall have provision for fixing exhaust/inlet fan.

7 BURGLARY RESISTANCE TEST

7.1 Terminology

7.1.1 620 *cm*^{2} *Opening*

An opening with diameter 281 mm.

7.1.2 *Common Hand Tools*

7.1.2.1 *Chisel*

Weight 0.25 to 1.5 kg and length 300 to 450 mm.

7.1.2.2 *Punches*

Weight 50 to 100 g and length 100 to 150 mm.

7.1.2.3 *Wrenches*

Pipe wrenches fixed or adjustable, 15 to 25 mm dia and 225 to 450 mm length.

7.1.2.4 *Spanners*

Standard available double ended or ring spanners, fixed or adjustable, 225 to 380 mm length.

7.1.2.5 *Screw drivers*

Dia 8 to 13 mm and total length 250 to 300 mm.

7.1.2.6 *Pliers*

Standard or combination, length 150 to 200 mm and weight 170 to 300 g.

7.1.2.7 *Hammers and sledges*

Head weight 1.7 to 3.5 kg and length 200 to 600 mm.

7.1.2.8 *Pry bars and ripping tools*

Rod diameter 18 to 20 mm or Hex 20 to 25 A/F and length 1 000 to 1 200 mm.

7.1.3 *Picking Tools*

These include common or standard patterns that are not designed for use against a specific make of ventilator.

7.1.4 *Impact Tools*

Includes portable electric impact hammer 25 mm size rated 850 to 1 150 W, maximum impact energy 10 J and rated speed 1 300 to 2 900 blows per minute (bpm) and with high speed steel (HSS) chisel length 300 to 450 mm, electric hand drills, hammer drills high speed steel (HSS) and carbide tipped 650 to 820 W, drill diameter 6 to 25 mm.

7.1.5 *Portable Electric Tools*

Electric hand drills accommodating drill bits not larger than 20 mm and coring drills. It includes carbide tipped drills and also portable abrasive cutting wheels. Rated 550 to 800 W, drill diameter 6 to 13 mm.

7.1.6 *Power Saws*

These include circular saws 600 to 1 100 W, wheel diameter 75 to 200 mm, hole saws 100 to 305 mm in diameter and reciprocating saws rated 600 to 1 150 W, blade length 150 to 200 mm.

7.1.7 *Gas Cutting Torch*

A commercially oxygen-acetylene fuelled cutting torch 180º (straight) OR 90°(angled), length of 900 to 1 300 mm and nozzle diameter of 3.15 mm maximum. The quantity of gas consumed (combined total oxygen and fuel gas) in any one test shall be limited as follows:

For class B ventilator	56 m^3
For class A ventilator	112 m^3
For class AA ventilator	224 m^3
For class AAA ventilator	336 m^3

7.2 Net Working Time

7.2.1 As the object of the investigation is to arrive at conclusion as to the resistance of a ventilator to expert attack, the testing team, consisting of two skilled operators at a time may select a number of attacks within the scope of the test procedure and attempt each attack for the full-allotted time.

7.2.2 The net working time is to be understood to cover only the period during which an attack is actively in progress on the ventilator and is to be exclusive of preparation time for test and time required for safety precautions. The attack shall be in one continuous operation.

7.3 Sample for Testing

A single sample, known to be fully representative of a series of ventilators of similar design and construction, shall be subjected to test. Such sample shall be selected on the basis of random sampling by appropriate agency.

7.4 Cutting an Opening

An attempt shall be made to cut an opening of 620 cm^2 (*see* **7.1.1**) entirely through the slab/plate to inner slab/plate).

7.5 Criteria for Acceptance

7.5.1 *Class B Ventilator*

The ventilator shall resist entry when attacked continuously at a given point or area using the tools specified in **7.1.2** to **7.1.7** for a net working time (*see* **7.2.1** and **7.2.2**) of 20 min.

7.5.2 *Class A Ventilator*

The ventilator shall resist entry when attacked continuously at a given point or area using the tools specified in **7.1.2** to **7.1.7** for a net working time (*see* **7.2.1** and **7.2.2**) of 45 min.

7.5.3 *Class AA Ventilator*

The ventilator shall resist entry when attacked continuously at a given point or area using the tools specified in **7.1.2** to **7.1.7** for a net working time (*see* **7.2.1** and **7.2.2**) of 90 min.

7.5.4 *Class AAA Ventilator*

The ventilator shall resist entry when attacked continuously at a given-point or area using the tools specified in **7.1.2** to **7.1.7** for a net working time (*see* **7.2.1** and **7.2.2**) of 120 min.

8 FINISH

All dents, burrs and sharp edges shall be removed from various components and they shall be thoroughly degreased, cleaned of rust and scale.

9 PAINTING

The inside and outside surfaces of the air ventilator shall be painted or powder coated. In case of paint, an appropriate primer and undercoating shall be used in accordance to industry practices. The minimum overall thickness of the coatings shall be 50 µ for powder coating and 70 µ for liquid paints. Cross hatch test shall be conducted to conform the adhesion of coating in accordance with **9.1**.

9.1 Cross Hatch Test

a) Make 6 parallel cut marks using sharp metal pointer and straight edge, through the painted/coated surface, so as to make the base surface visible through cut marks.

b) Cut marks shall be minimum 20 mm long and at 2 mm distance from each other.

c) Make 6 similar cut marks in the direction perpendicular to first set of cut marks, with same length and spacing.

d) These 12 cut marks together shall make a pattern of 25 squares of 2 mm × 2 mm size, totally separated from each other.

e) A good quality transparent adhesive tape not less than 20 mm width shall be stuck on the pattern, parallel to any one set of cut marks.

f) To ensure continuous contact with paint/coat film, rub the tape firmly and remove air bubbles under the tape, if any.

g) Within 60 to 120 s after sticking the tape, remove it by seizing free end of the tape and rapidly pulling it off at an angle close to 180º.

h) Painting/coating quality is considered as acceptable, if no part of any 2 mm × 2 mm square of paint/coat comes off the surface due to pulling the tape.

10 MARKING

10.1 Air ventilators shall be marked with the manufacturer’s name or trade-mark.

10.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

11 PACKING

Each air ventilator shall be packed in accordance with the best trade practice.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
191 : 2007	Copper — Specification (*fourth revision*)
736 : 1986	Wrought aluminium and aluminium alloy plate for general engineering purposes (*third revision*)
737 : 2008	Wrought aluminium and aluminium alloy sheet and strip for general engineering purposes (*fourth revision*)
1079 : 2017	Hot rolled carbon steel sheets and strips — Specification (*seventh revision*)
2062 : 2011	Steel for general structural purposes — Specification (*seventh revision*)
5986 : 2017	Hot rolled steel flat products for structural forming and flanging purposes — Specification (*fourth revision*)
513 (Part 1) : 2016	Cold reduced low carbon steel sheet and strips: Part 1 Cold forming and drawing purpose (*sixth revision*)
513 (Part 2) : 2016	Cold reduced low carbon steel sheet and strips: Part 1 High tensile and multi-phase steel (*sixth revision*)

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Security Equipments Sectional Committee, MED 24

Organization	*Representative (s)*
Reserve Bank of India, Mumbai	Shri D. K. Raghu (***Chairman***)
Bank of India, Mumbai	Capt Akhilesh Kumar
Central Building Research Institute, Roorkee	Dr Suvir Singh Dr Rajiv Kumar (*Alternate*)
Central Bank of India, Mumbai	Col A. K. Jha
EMTAC Laboratories Private Limited, Hyderabad	Shri Supriyo Ganguly
Godrej & Boyce Manufacturing Company Limited, Mumbai	Shri P. Chouthkanthiwar Shri Pushkar Gokhale (*Alternate*)
Guardwel Industries Private Limited, Mumbai	Shri John Dmello Shri Leon George (*Alternate*)
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BIS Directorate General	Shri Rajneesh Khosla, Scientist 'E' and Head (MED) [Representing Director General (*Ex-officio*)]

Member Secretary

Ms Khashboo Kumari
Scientist 'C' (MED), BIS

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Amendments Issued Since Publication

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